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ABSTRACT

A 13-item adult risk taking scale was selected by factor analysis and internal reliability testing from 25 items administered to 270 urban adults (56% Black; 33% White; 11% Hispanic/other) stratified by socioeconomic status. Chronbach's alpha equaled 0.77. Five items refer to risk of injury, five to risk of illness, one to gambling, and two to general risk taking propensity. Items were measured on a six-point scale representing "Strongly Agree" to "Strongly Disagree." The resulting Bush-Iannotti Adult Risk Taking Scale (BIARTS) was correlated with socioeconomic status indicators, psychosocial and health-related variables, alcohol use, and risk of injury and risk of illness scales of the subjects' children. In addition to its proven utility in a model to predict expected medicine use for common health problems, the BIARTS may have utility for areas of health behavior such as disease prevention and compliance with physician directives. Pilot questions for the risk-taking scale are included, with item correlations. (Author/SLD)

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DEVELOPMENT OF AN ADULT RISK-TAKING SCALE

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ABSTRACT

A 13-item adult risk taking scale was selected by factor analysis and internal reliability testing from 25 items administered to 270 urban adults (56% black; 33% white; 11% Hispanic/other) stratified by socioeconomic status. Chronbach's alpha equaled .77. Five items refer to risk of injury, five to risk of illness, one to gambling and two to general risk taking propensity. Items were measured on a 6-point scale representing "Strongly Agree" to "Strongly Disagree". The resultant BIARTS (Bush-Iannotti Adult Risk Taking Scale) was correlated with socioeconomic status indicators, psychosocial and health related variables, alcohol use, and risk injury and risk illness scales of the subjects' children. In addition to its proven utility in a model to predict expected medicine use for common health problems, the BIARTS may have utility for areas of health behavior such as disease prevention and compliance with physician directives.

Risk has been measured in terms of financial risk (Carney, 1971), particularly in risk to benefits decision making models, and social risk (e.g., Schultz & Moore, 1986; Crott et al., 1986) but there is a need for a measure of personal risk in adults, particularly as it relates to health. In the first phase of a longitudinal study using risk injury and risk illness scales developed by Campbell and Carney (unpub), in the evaluation of a children's health belief model, we found that risk taking relative to illness and injury was associated with children's health beliefs and behaviors relative to taking medicines for common health problems, use and expectations to use alcohol and cigarettes, and a number of psychosocial constructs (Ahmed et al., 1982; Bush, 1986). In the second phase of the study, emphasis was placed on the origin and development of children's health beliefs and behaviors, investigating their relationship to the health beliefs and behaviors of the children's mothers. No suitable adult risk taking scale was found with which to compare the risk taking propensity of offspring. To meet this need, an adult risk taking scale was formulated, pilot tested, revised, administered to a sample of adults, reduced, and then investigated for its relationship with other characteristics of

the subjects, and for its ability to explain risk taking propensity in the subjects' children.

METHODS

An initial list of 27 items chosen on the basis of face validity to represent general risk taking propensity and three risk areas (health, injury, gambling) and general risk, was pilot tested on a convenience sample of ten adults who were asked to comment on the items and to suggest other measures of risk taking. From this list and after revisions, 25 items were selected for evaluation. These items were administered by telephone to 270 adults as part of a survey of health related attitudes and behaviors in 1984-85.

The sample was comprised of the primary caretakers of students in elementary school grades 3-7; 93 percent were the children's mothers. A stratified sample was selected on the basis of three socioeconomic (SES) levels (determined by the average annual family income in the school census tract) and the sex and grade of the children. Fifty-six percent of the subjects were black; 33 percent were white, and the remainder were Hispanic or "other." The average subject had 14.5 years of education; 14.5 percent lived in households where the average family income was below $10,000; 23.8 percent where it was $10,000-$19,999; 15.8 percent where it was $20,000-$29,999; 21.9 percent where it was $30,000-$49,999; and 24.3 percent where it was $50,000 or more.

For the telephone interviews, subjects were asked to get a piece of paper and a pencil and to number from one to six across the page. The subject was then asked to write "strongly disagree" under the one, and "strongly agree" under the six, and to respond to questions according to the scale. An unlimited number of test questions were asked until the interviewer was certain that the respondent understood how to use the scale.

Principal components factor analysis and Chronbach's alpha were used to select a final adult risk taking scale. Relationships between this scale and other relevant demographic, health related, and children's risk taking variables were explored.

RESULTS

Adult Risk Taking Scale Item Selection

Table 1 lists the 25 questions which the subjects were asked with their factor loadings. Items with loadings greater than $\pm$.350 were analyzed for internal reliability using Chronbach's alpha after the responses to the negative items were reversed by subtracting them from seven. The maximum alpha of .770 was achieved with 13 items measured on the 6-point scale; these items are shown in Table 2 with their item-total correlations. The mean of this scale was 33.23 $\pm$ 10.65 S.D.; range 13-60 (possible 13-78) low to high risk taking propensity. The scale includes two general questions and questions from the three areas, i.e., risking illness (5 items), risking injury (5 items), and gambling (1 item).

Correlations for Adult Risk Taking Scale by Other Variables

Pearson product moment correlations for the risk taking scale (BIARTS) with selected demographic and health related variables are shown in Table 3. BIARTS was significantly positively correlated with educational level. Other socioeconomic status indicators available were ethnicity, marital status, and family income. An examination of the means indicated Hispanics were the least risk taking group with a mean of 23.7 on the BIARTS; blacks were next highest with a mean value of 30.1 as compared with white respondents with a mean value of 39.9. These differences were significant at the $p<.0001$ level. Marital status and family income also were significant at the $p<.0001$ level, indicating that higher socioeconomic status (SES) primary caretakers in two parent households tend to have greater risk taking propensity than others.

BIARTS scores were not significantly correlated with the Wallston Health Locus of Control Scale (Wallston, 1976), but were negatively correlated with the Rosenberg Self-Esteem Scale (Rosenberg & Simmons, 1972) (Table 3), suggesting that risk takers have somewhat lower self-esteem than other respondents.

The six variables following Self-Esteem in Table 3 were all measured on the 6-point scale; questions were asked relative to each of five common health problems (cold, fever, upset stomach, nervousness, trouble sleeping), and scores summed across the five responses. Table 3 shows that the BIARTS was significantly positively correlated with Perceived Vulnerability to Illness.

Table 3 also shows that the BIARTS was significantly negatively correlated with Perceived Benefit of Medicines, Illness Concern, and Expectation to Visit Physician, but not with Expectation to Take Medicines for the health problems. These relationships suggest that persons who are the most risk taking feel they are more likely to acquire common health problems than others, but that they are less likely to be concerned or to visit a physician for the health problems when they occur.

As for abusable substances, the adult risk taking scale was significantly positively correlated with Perceived Vulnerability to Drug Dependency and Alcohol Drinker or Ex-Drinker but not with Cigarette or Marijuana Smoker or Ex-Smoker. This suggests that the respondents who have the most risk taking propensity also are most likely to feel they are the kind of persons who could become dependent on a drug. The positive correlation with alcohol use is consistent with SES relationships. High SES respondents were more likely to be alcohol users than low SES respondents and also indicate greater risk taking propensity.

Risk Taking Correlations between Caretakers and Children

As shown in Table 4, significant positive correlations were observed between the BIARTS and both of the children's risk taking scales (Risk Illness and Risk Injury). Correlations between boys and their mothers were stronger than between girls and their primary caretakers for both scales. Correlations are also generally higher between higher SES and older children and

their primary caretakers than between lower SES and younger children and their primary caretakers.

DISCUSSION

The BIARTS appears to be an internally reliable scale that offers promise for future research, particularly in the area of health beliefs and behaviors. In both children and mothers, risk taking propensity was found to be a significant variable in Health Belief Models developed to explain medicine use expectations, integrating and explaining relationships between demographic variables (particularly SES with which it is positively associated), and readiness to take health action variables (Bush et al., 1985; Bush, 1986). In a path analysis adopted from the Health Belief Model (Bush, 1986), the BIARTS was a significant modifying variable between socioeconomic status indicators and two "readiness" to take medicine variables, Perceived Vulnerability (to illness) with which it is positively related and Perceived Severity (of illness), with which it is negatively related. Both of these "readiness" variables were positively related to Expected Medicine Use. The opposing relationship of the BIARTS with these two readiness to take medicine variables accounts for the failure of BIARTS to reach significance in its negative correlation with Expected Medicine Use.

BIARTS appears to be a useful addition to motivational constructs developed for Health Belief Models. The original conception of the HBM (Rosenstock, 1966) included the following major elements: the level of threat posed by a health problem as perceived the individual's perception of the severity and susceptibility to it; the perception of benefit from engaging in a behavior to reduce the threat; the barriers (physiological, physical, economic, social) to performance of the behavior, and some type of cue or action. Becker et al. (1977) reformulated the paradigm to include health motivations to account for differences in concern over health matters and to include general health orientations. A component of "readiness" to take action for a health problem is thus an individual's perception of the reward to be gained from engaging in a health behavior as compared with the costs. Risk taking propensity offers promise to help explain the general construct motivation. An individual who is more risk taking may be more ready to risk the consequences of not engaging in a health behavior. Risk taking itself may carry certain inherent rewards which must be weighed in the balance against the cost of action.

In previous work with children, older children scored higher on both risk injury and risk illness scales. Boys scored higher on risk injury but not risk illness scales suggesting that circumstances mediate sex differences in children (Campbell & Carney, unpub.; Bush 1986). Risk taking has been associated with children's alcohol and cigarette use and use expectations (Ahmed

et al., 1982; Iannotti & Bush, 1986; Iannotti et al., 1986). It seems reasonable to hypothesize that older children and higher SES children and adults may be more willing to take risks because they are more skilled in evaluating the probability of adverse outcomes and more confident in their abilities to deal with adverse consequences should they occur.

The transmission of risk taking propensities to children by their primary caretakers is suggested by the positive correlations between children and their primary caretakers on their respective risk taking scales. The development of children's perspectives on risks is part of the ongoing acquisition of social orientations in which parents play a major role, and which are influenced by sociocultural factors. Developmental effects are suggested if the child's risk taking propensities become more like the parent as the child grows older. In this study, developmental effects were supported by the finding of stronger risk taking correlations between primary caretakers and older children than between primary caretakers and younger children. The stronger correlations between boys and their primary caretakers than between girls and their primary caretakers was not expected and we can offer no explanation for this result.

The population used in this study was urban and consisted primarily of mothers of elementary school age children. Further research is needed to evaluate the scale in different populations, particularly males and older adults. The BIARTS may

have utility for other areas of health behavior such as disease prevention and compliance with physician directives.

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TABLE 1. Risk Taking Scale Pilot Questions and Factor Loadings

Questions	Factor Loading
1. If I had a heart ailment and the doctor told me to lose ten percent of my weight, I would follow the doctor's orders.	.383
2. If given the choice between losing the weight and having a risky operation, I would choose the operation.	.133
3. I stay up late to work or have fun.	-.086
4. I drive after I've had two or more drinks of marijuana cigarettes.	-.446
5. I buckle my seat belt when I'm in a car.	.099
6. I drive over the speed limit or ride with people who do.	-.542
7. I take vitamins or minerals on a regular basis.	.264
8. I would go skydiving if a friend invited me.	-.080
9. If the walks and streets are icy outside, I stay inside.	.408
10. I check for fire exits when I go to new places.	.572
11. I wash my hands before eating.	.558
12. If I won $20 in a game of chance, I would keep the money rather than continue playing.	.422
13. I have a physical exam at least once a year.	.501
14. I read the directions on over-the-counter medicines.	.354
15. Compared to others, I played rough as a child.	-.011
16. If I found $50, I would be more likely to risk some of it in a game of chance than to save it all.	-.218
17. I drink out of glasses that others have used or take bites of other people's food.	-.494
18. I play the lottery.	.091
19. I follow doctor's directions when taking prescription medicines.	.379
20. I am a person who takes risks.	-.479
21. I jay walk or cross against lights.	-.501
22. I am careful to dress so I won't get wet or cold.	.543
23. I enjoy betting on games of chance like poker or sports events.	-.207
24. I read the nutrition information on foods before I buy them.	.496
25. I am a pretty careful person.	.696

TABLE 2. Bush-Iannotti Adult Risk Taking Scale and Item-Total Correlations.

Questions	
1. I drive after I've had two or more drinks of marijuana cigarettes.	.36
2. I drive over the speed limit or ride with people who do.	.44
3. If the walks and streets are icy outside, I stay inside.*	.34
4. I check for fire exits when I go to new places.*	.49
5. I wash my hands before eating.*	.36
6. If I won $20 in a game of chance, I would keep the money rather than continue playing.*	.37
7. I have a physical exam at least once a year.*	.36
8. I drink out of glasses that others have used or take bites of other people's food.	.43
9. I am a person who takes risks.	.38
10. I jay walk or cross against lights.	.42
11. I am careful to dress so I won't get wet or cold.*	.37
12. I read the nutrition information on foods before I buy them.*	.42
13. I am a pretty careful person.*	.54

* reversed prior to summing (7-item)

Chronbach's alpha = .77
Mean 33.23 $\pm$ 10.65 S.D.; Range 13-60 (low to high risk taking propensity)

TABLE 3. Correlations Between Bush-Iannotti Risk Taking Scale and Demographic, Psychosocial and Health Related Variables.

Variable	Correlation
Years of Education	.38 ($p \leq .0001$)
Health Locus of Control[1]	.05 (ns)
Self-Esteem[2]	-.12 ($p \leq .05$)
Perceived Vulnerability to Illness	.14 ($p \leq .05$)
Perceived Benefit of Medicines	-.15 ($p \leq .05$)
Perceived Benefit of NonMedicines	.07 (ns)
Illness Concern	-.25 ($p \leq .0001$)
Expectation to Visit Physician	-.31 ($p \leq .0001$)
Expectation to Take Medicines	-.09 (ns)
Perceived Vulnerability to Drug Dependency	.26 ($p \leq .0001$)
Alcohol Drinker or Ex-Drinker	.22 ($p \leq .001$)
Cigarette Smoker or Ex-Smoker	.04 (ns)
Marijuana Smoker or Ex-Smoker	.02 (ns)

1 Wallston Health Locus of Control Scale
2 Rosenberg Self-Esteem Scale

For measurement of other variables, contact authors.

TABLE 4. Correlations[1] Between Primary Caretaker and Child Risk Taking Scores by Children's Sex, Socioeconomic Status and Grade.

	CORRELATIONS								
	ALL	SEX		SES			GRADE		
		M	F	L	M	H	3-4	5-6	7
Risk-Illness	.26[c]	.31[c]	.21[a]	-.03	.29[a]	.23[a]	.20[a]	.28[b]	.32[a]
Risk-Injury	.22[c]	.27[b]	.15	.11	.14	.10	.23[a]	.19	.28

1 a $p<.05$, b $p<.01$, c $p<.001$.